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Incremental prognostic value of changes in 3D right ventricular function in pulmonary hypertension

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Background
Outcomes in pulmonary hypertension (PH) are related to right ventricular (RV) function and remodeling. We hypothesized that changes in RV function, especially area strain (AS), could provide incremental prognostic data.

Purpose
To assess global and regional 3D RV function changes between baseline and 6-months visit and evaluate their prognostic value in PH.

Methods
In total, 65 PH patients were prospectively included in this longitudinal study. All patients underwent 2D and 3D transthoracic echocardiography at baseline and 6-month follow-up. 3D RV echocardiographic sequences were analyzed by semi-automatic software and output meshes were post-processed to extract regional deformation.

Results
At baseline, there was no significant difference in RV AS between patient subgroups. Patients who were considered clinically stable or improving presented at 6-months a significant increase in RV EF (P = 0.04) and decrease in RV global AS (P = 0.001) (Fig. 1). The most significant regional changes occurred within the septum. Over a median follow-up of 24.8 months [22.1–25.7], 16 patients died from PH or were transplanted. On multivariate COX analysis, 6-month changes in WHO class (HR 17.4[5.2–58.5]), BNP (HR 1.003[1.001–1.004]) and RV global AS (HR 1.12[1.03–1.21]) were independent predictors of survival.

Conclusion
Changes in WHO function class, BNP and 3D RV AS could help stratifying the PH patients' risk. Our study demonstrates the additional prognostic value of following changes in RV deformation using 3D echocardiography.